



The Intelligent Systems



Industry 4.0 Innovator



Versatile Solutions for the
Multimedia Age



Empowering the
Mobile Workforce



A Passion for Quality,
Security and Connectivity

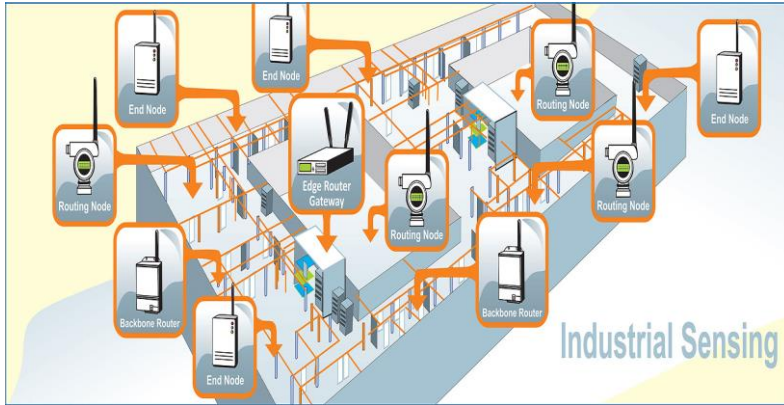


Cyber Smart, Hyper Vision

Deploying ISA100 Wireless Distributed Networks

YC Cheng
NEXCOM
2016/09/27

Go Industrial Wireless for IIOT

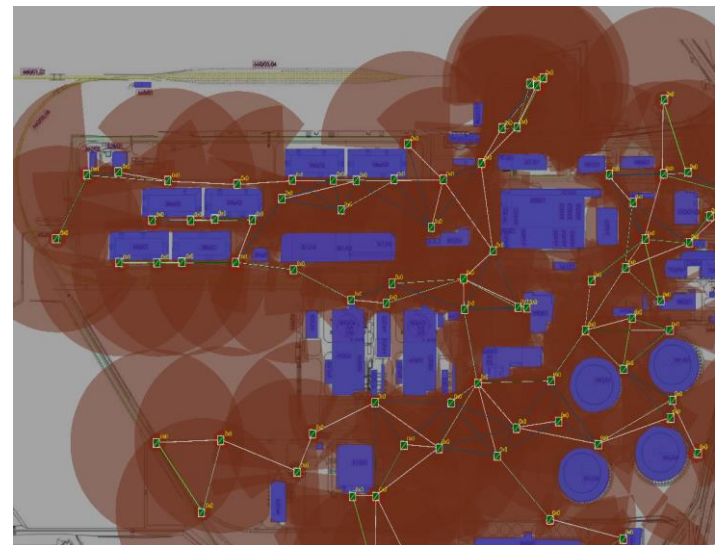
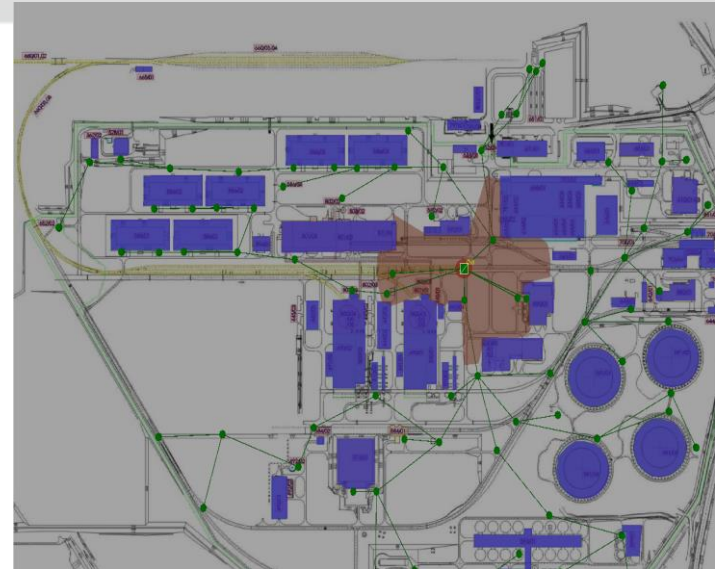


- Industrial IoT
- Industrial Wireless Sensor Network
- Industrial Wi-Fi Backbone
- Industrial Network and Asset Manager



Current Status Quo

- **Recent trend - deployments require**
 - Increased scalability
 - Support for higher network throughput
- **Due to the emergence of novel ISA100 Wireless compliant instruments such as**
 - Stream trap monitoring
 - Safety – gas detection
 - Corrosion monitoring
 - Condition monitoring



Technical Primer – Logical Roles



Field Network

I/O Device	Sources or consumes data. Does not route.
Router	Routes messages for other devices operating in the wireless subnet.



Infrastructure

Backbone Router	Routes data over the backbone infrastructure.
System Manager	Provides policy controlled management for all network devices.
Security Manager	Enables, controls and supervises the secure operation of all devices.
Gateway	Provides an application interface between the wireless and the plant network.



Operational

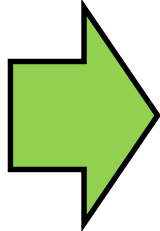
Provisioning	Provisions devices with configurations required for network operation.
System Time Source	Responsible for maintaining the master time source of the network.

Note: Devices typically incorporate multiple logical roles.

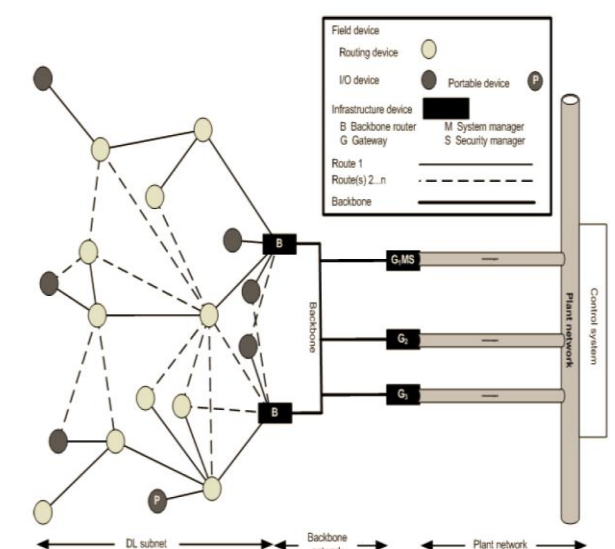
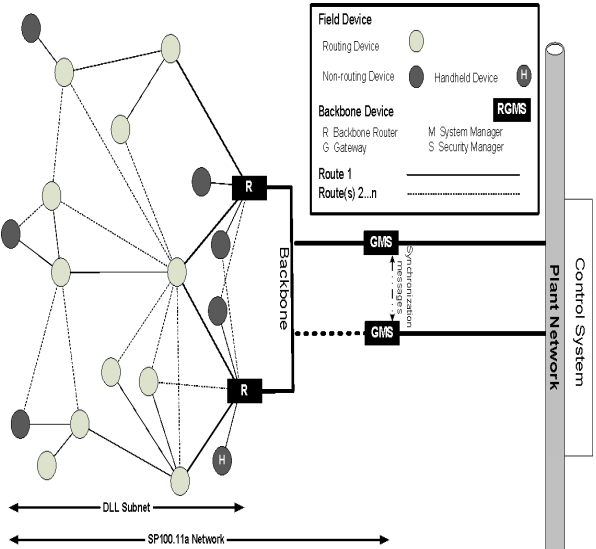
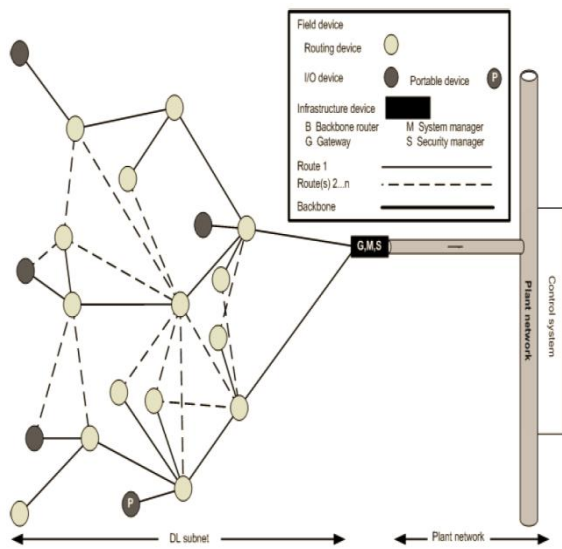


Technical Primer – Network Topologies

ISA100 standard inherently supports various different network topologies



Infrastructure devices can support a combination of logical roles



Single Subnet – “All-In-One”

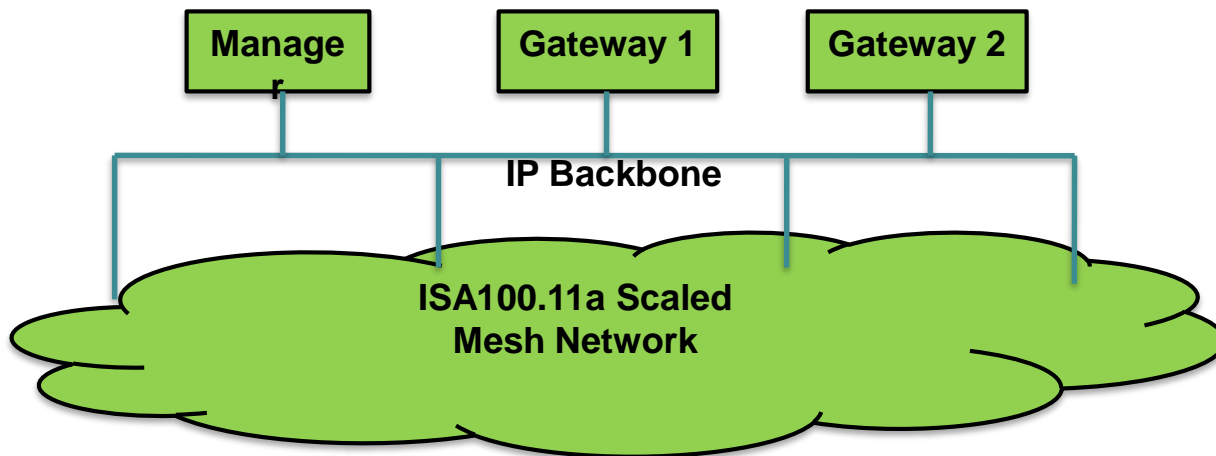
Multiple Subnets – “Distributed”

Multiple Gateways

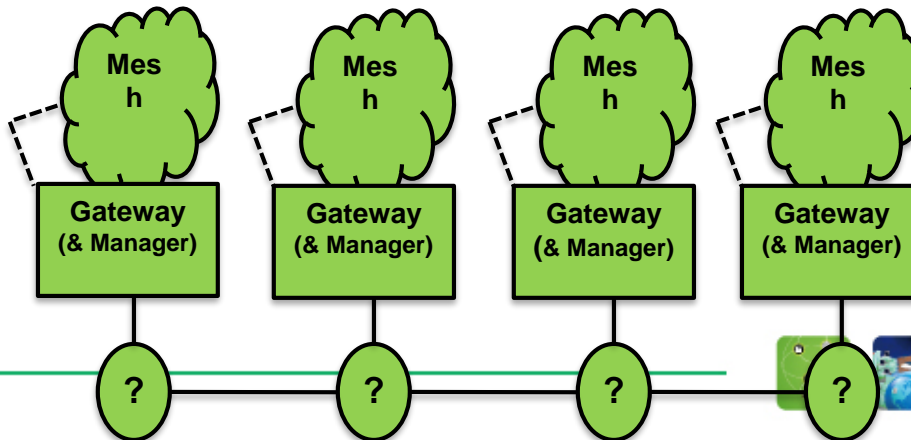
ISA100 Wireless Network Topology

ISA100 Wireless networks – versatile topologies and scaling due to IPv6 based backbone infrastructure

ISA100 Wireless Network Topology



WirelessHART Network Topology



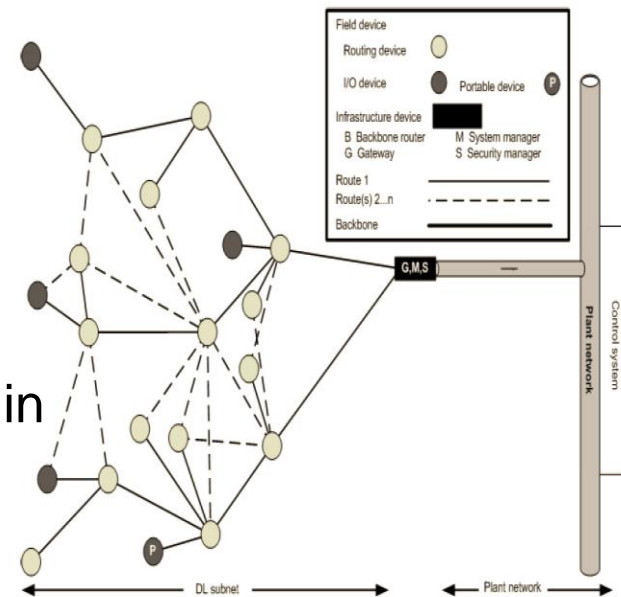
“All-in-One” Topology



- Simple network deployment
- Low cost installation and maintenance



- Limited scalability
- Deeper mesh networks result in
 - Increased power consumption results in shorter field instrument battery life
 - Increased communication latency
 - Decreased network throughput
- Limited geographic coverage



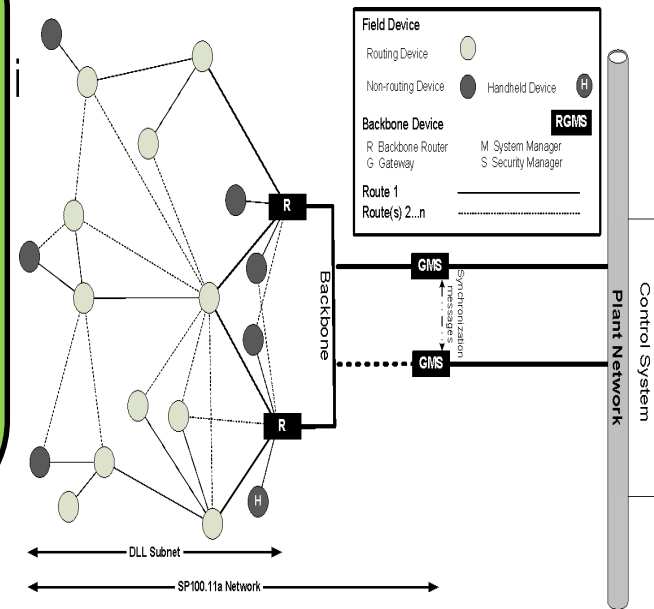
Distributed Topology



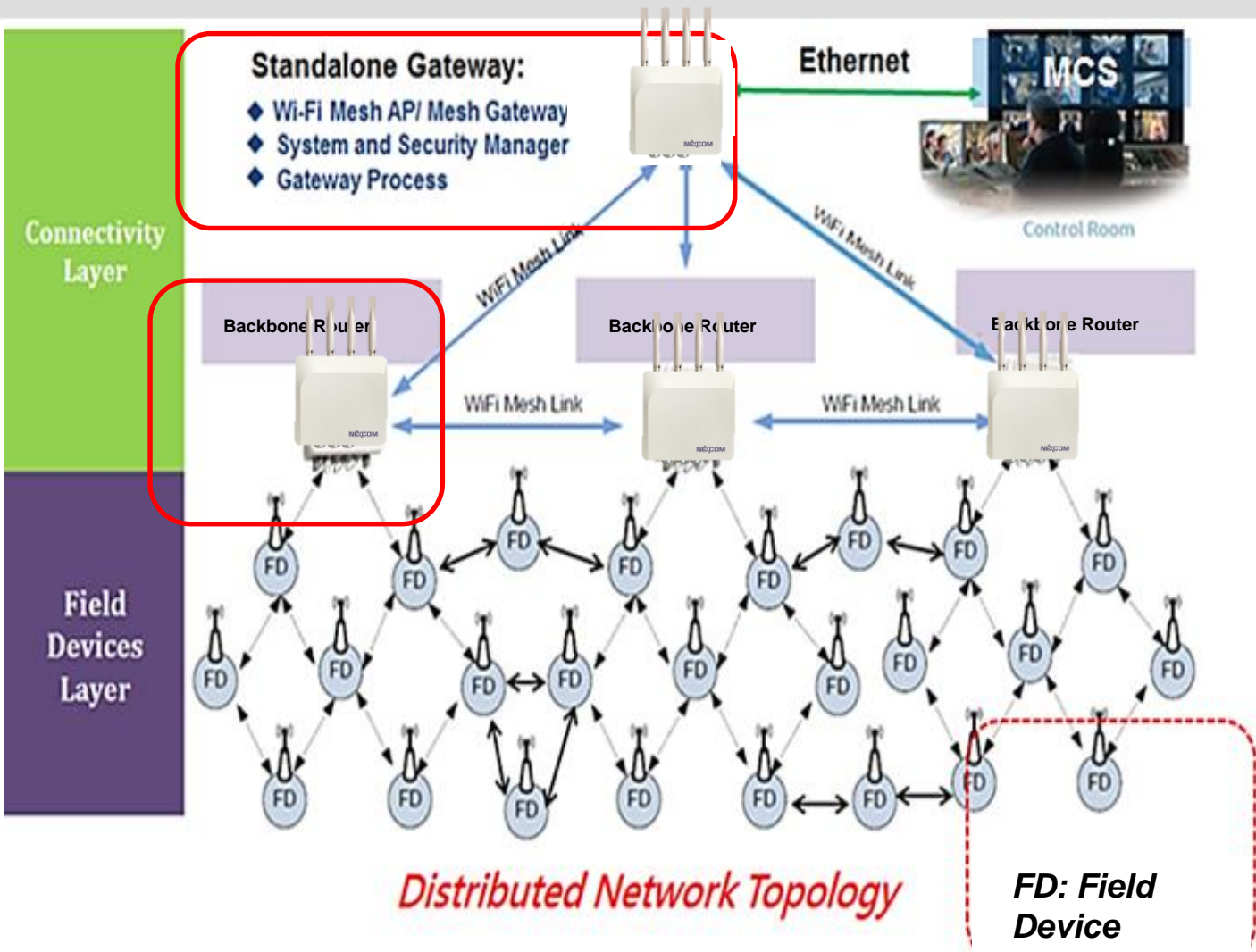
- Increased scalability
- Shallow mesh networks result in
 - Optimized power consumption results in increased field instrument battery life
 - Lower communication latency
 - Increased network throughput
- Extended geographic coverage



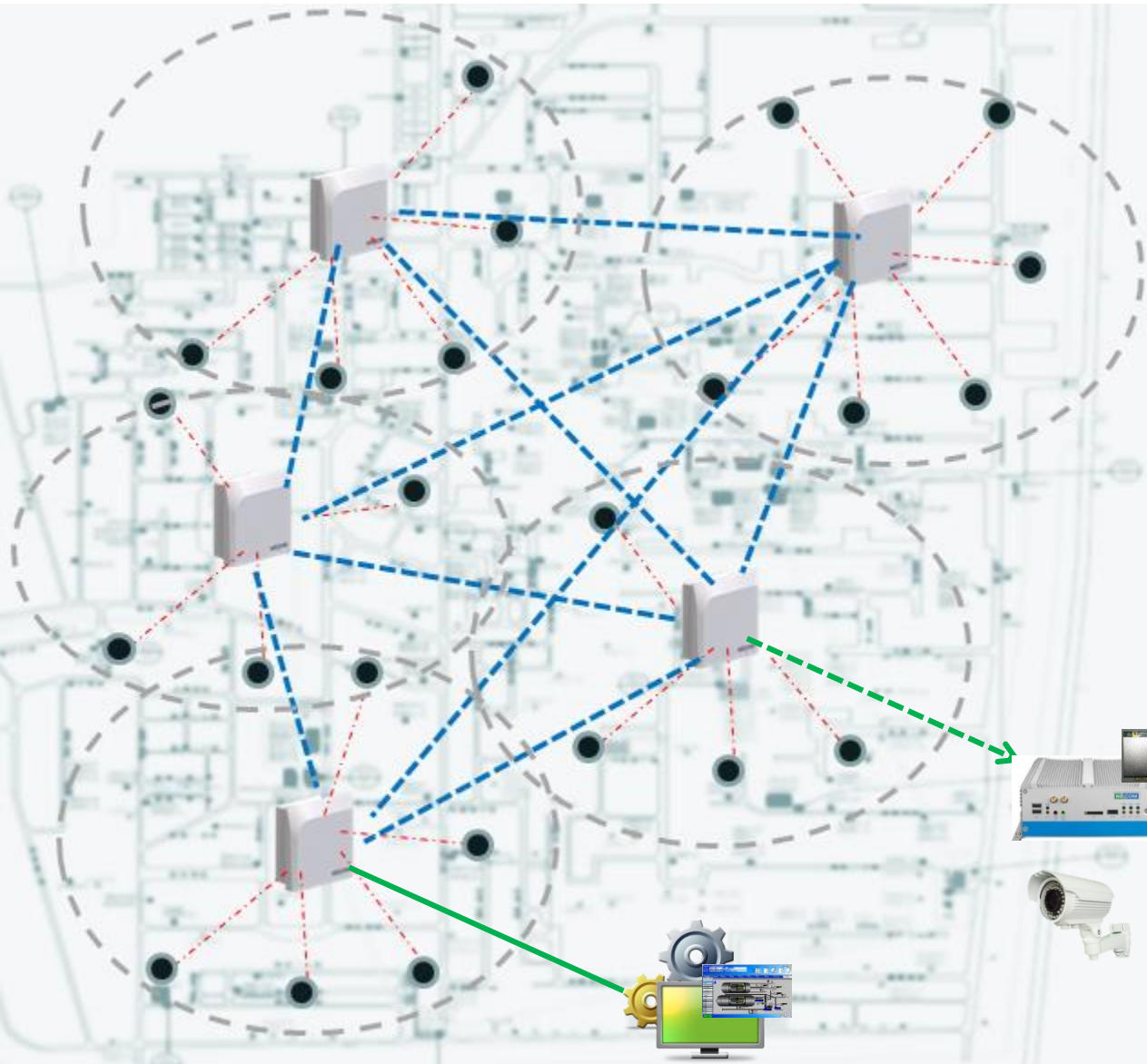
- Network deployment more complex
- Increased cost of installation and maintenance



Distributed Deploy– WiFi Mesh Backbone



Hybrid network of Wi-Fi & ISA100



Multi-link, more reliable

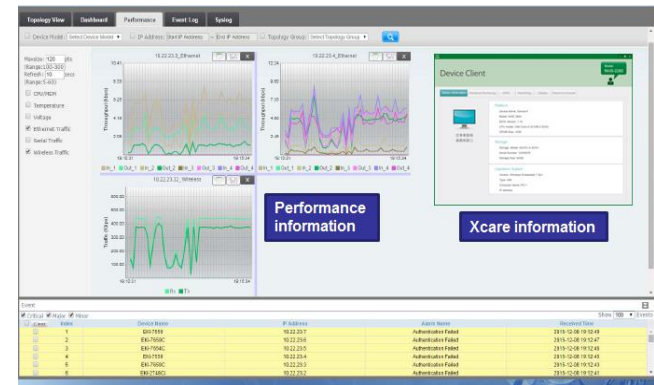
- Multi-redundancy for better reliable transmission
- Flexible to expand field device coverage
- Less maintenance expense in cabling
- High throughput backbone enable flexible application



Deployment Considerations

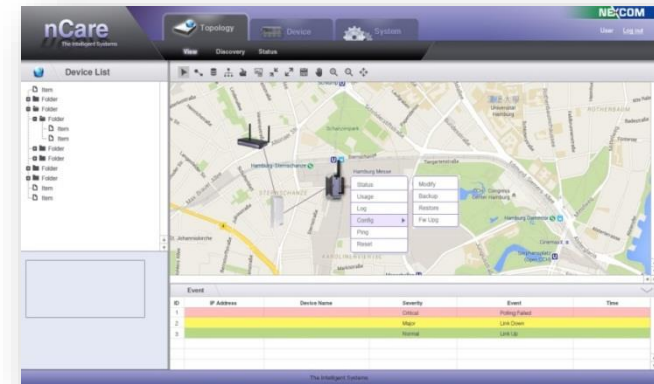
“All-in-One” deployments

- Gateway is installed outdoors
- Typically close to the control room
- Determining optimal location is vital
- Manageable mechanism is essential

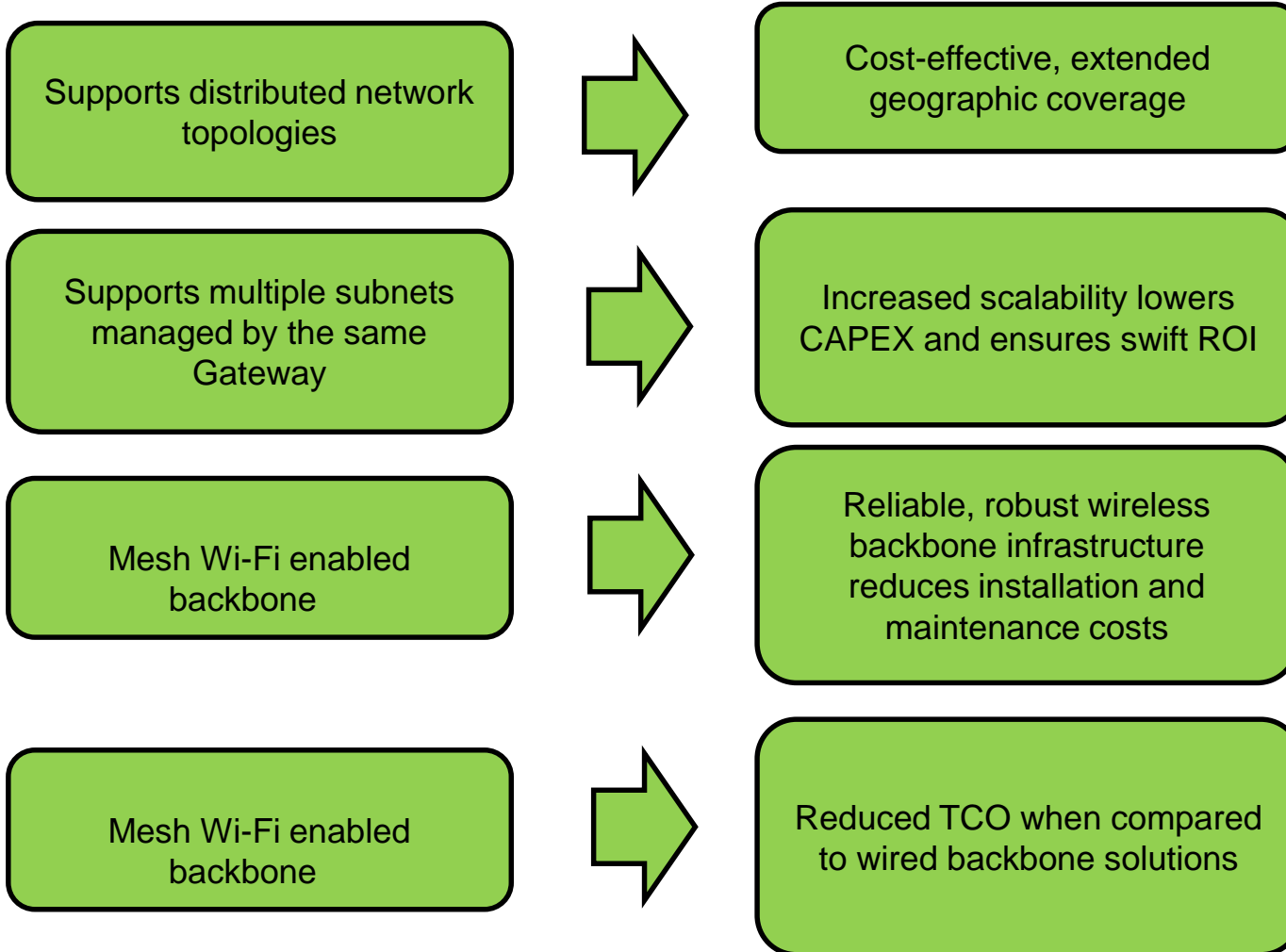


Distributed deployments

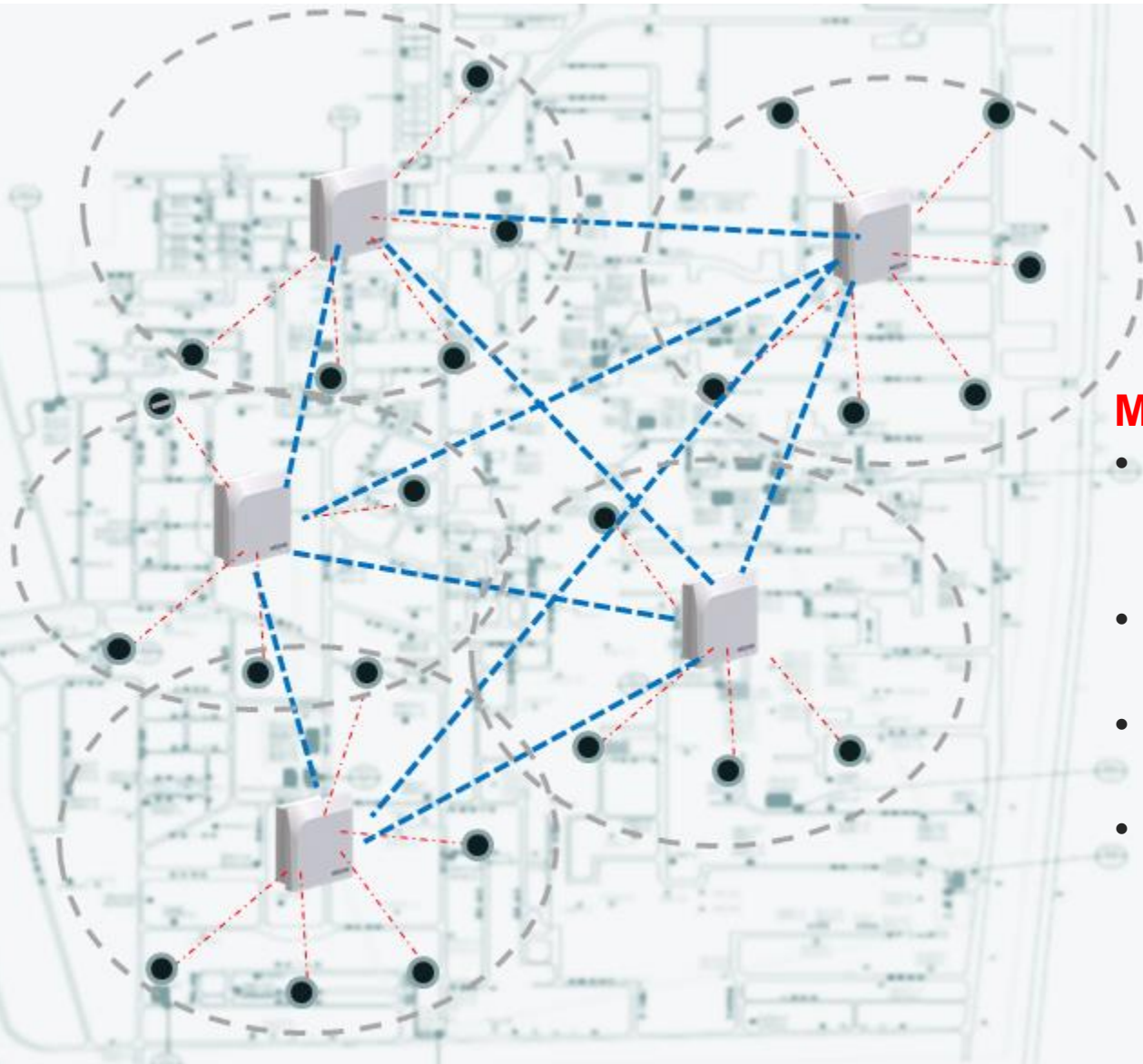
- Gateway is installed in the control room or outdoor next to control room
- BBRs deployed throughout the facility
- Wi-Fi Mesh backbone simplifies & enhance deployment flexibility
- Manageable mechanism is essential



Benefits



Hybrid network of Wi-Fi & ISA100

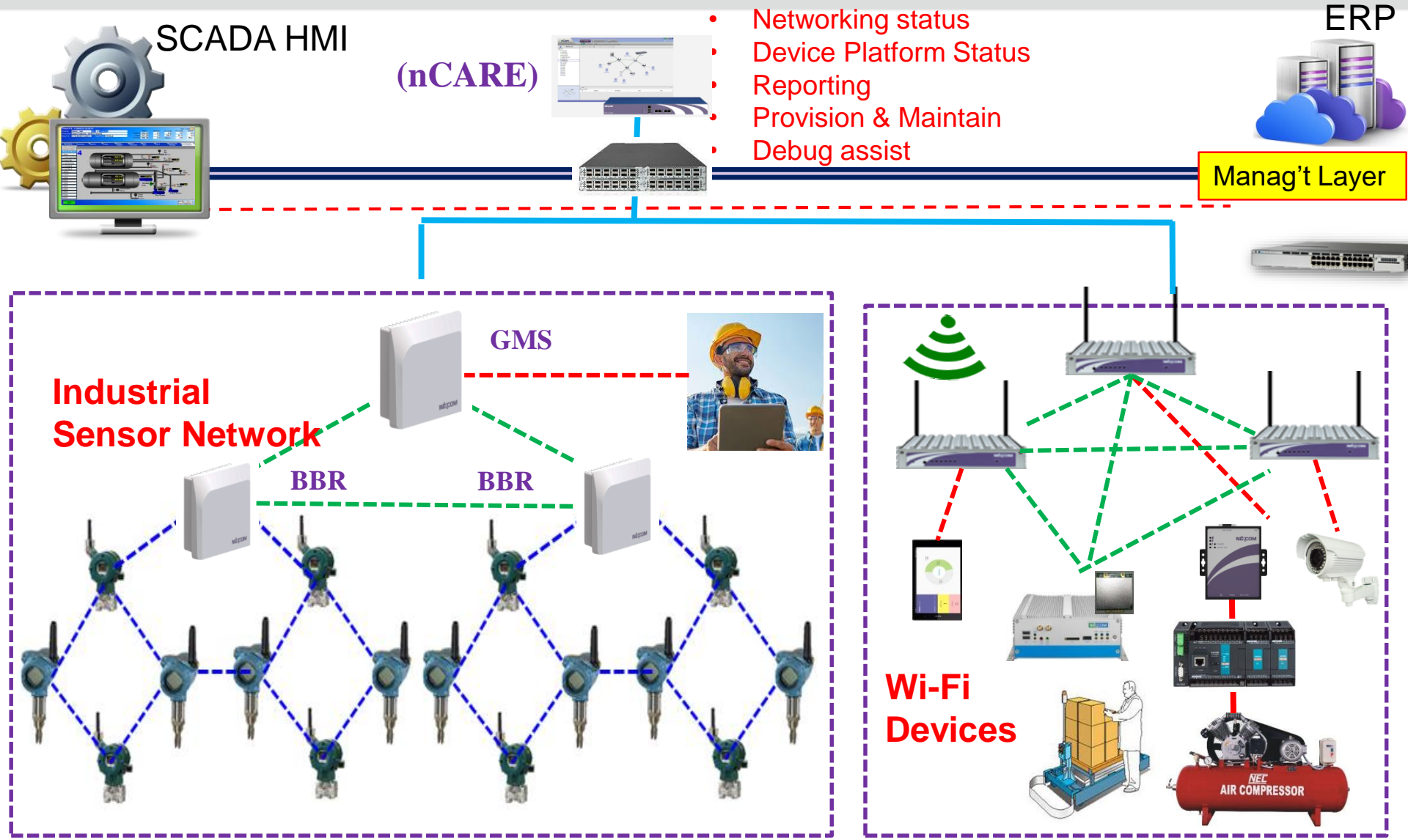


Multi-link, more reliable

- Multi-redundancy for better reliable transmission
- Flexible to expand field device coverage
- Less maintenance expense in cabling
- High throughput backbone enable flexible application



Dual Wi-Fi Mesh to Expand Coverage & Application



SCADA HMI

(nCARE)

ERP

Manag't Layer

- Networking status
- Device Platform Status
- Reporting
- Provision & Maintain
- Debug assist

Industrial Sensor Network

GMS

BBR

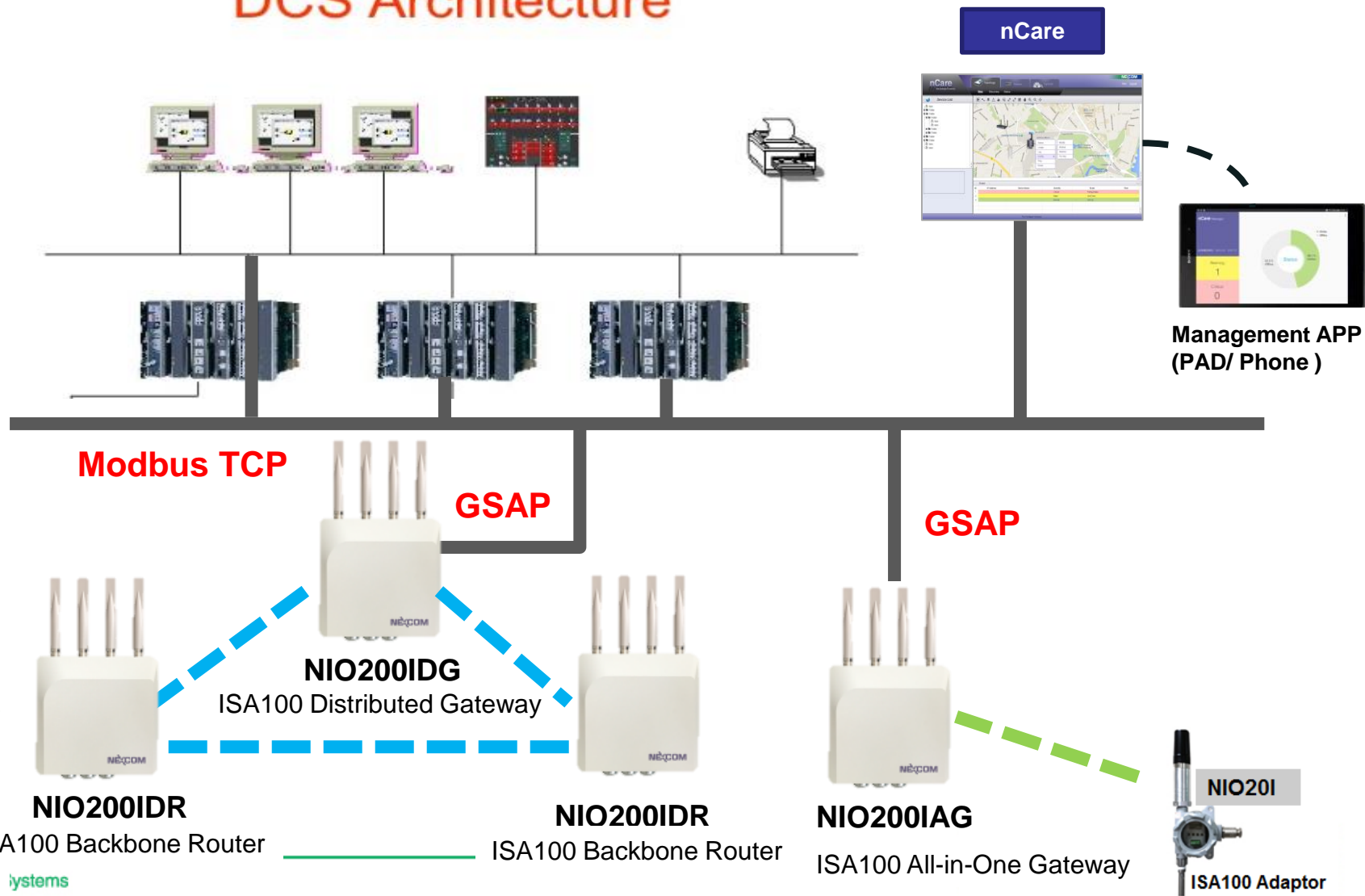
BBR

Wi-Fi Devices

NEC AIR COMPRESSOR

NEXCOM Architecture with nCare

DCS Architecture



The NIO200 Product Family



NIO200IAG – All-in1-Gateway

- ISA100 compliant System/Security Manager, Gateway and Backbone Router
- Manages an ISA100 subnet composed of field instruments arranged in a multi-hop wireless mesh configuration
- EZ Mesh Wi-Fi Backbone infrastructure connectivity to the control room + perfect triple play infrastructure video surveillance



NIO210IDG – Distributed Gateway

- ISA100 compliant System/Security Manager, Gateway and Backbone Router
- Manages multiple ISA100 subnets federated by NIO200IWR Backbone Routers
- Allows for distributed network topologies that maximize geographic
- EZ Mesh Wi-Fi Backbone infrastructure connectivity + perfect triple play infrastructure video surveillance



NIO200IDR – Backbone Router

- ISA100 compliant, cost-effective Backbone Router
- Provides wireless and wired backbone connectivity to ISA100 compliant wireless field instruments
- EZ Mesh Wi-Fi Backbone infrastructure connectivity + perfect triple play infrastructure video surveillance



Rugged Design



	ESD	Surge	EFT
Level-1	Contact: +/- 2KV	+/- 0.5KV	+/- 0.5KV
	Air: +/- 2KV		
Level-2	Contact: +/- 4KV	+/- 1KV	+/- 1KV
	Air: +/- 4KV		
Level-3	Contact: +/- 6KV	+/- 2KV	+/- 2KV
	Air: +/- 8KV		
Level-4	Contact: +/- 8KV	+/- 4KV	+/- 4KV
	Air: +/- 15KV		

Reliable wireless communication

- Multi-link Mesh topology
- High sensitivity RF radio (-95dBm)
- Redundant power source (DC & PoE)
- Robust system with EMC Level-4/ ATEX Anti-explosion / IP67/ Wide temp
- Central management by nCare



Contact

For additional information please visit

www.nexcom.com

Or

www.centero.com

or contact me at

yc_cheng@nexcom.com.tw





Thank You!